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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,106	03/19/2004	Mariano G. Fernandez	P19207	8494

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EXAMINER

NGUYEN, PHILLIP H

ART UNIT	PAPER NUMBER
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2191

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/805,106

Applicant(s)

FERNANDEZ ET AL.

Examiner

Phillip H. Nguyen

Art Unit

2191

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the original filing date of March 19, 2004. Claims 1-35 are pending and have been considered below.

Note:

2. Regarding claims 2, 3, 8, 13-16, 19, 20, 22, 24-27, 30 and 33 recite the phrases "capable of", "operable to" in the preamble and body of the claims. They indicate intended use and as such do not carry patentable weight. The limitations following the phrase "capable of" or "operable to" describe only intended use but not necessarily required functionality of the claim. In order for the limitations for be considered, Applicant is required to amend the claims so that the claim limitations are recited in a definite form. For example, claim 13 recites "circuitry operable to" should be changed to "circuitry" to say that the circuitry is performing the recited limitations.

Claim Objections

3. Claim 21 is objected to because of the following informalities: It should depend on claim 20 instead of depends on itself.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 13-35 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

- Regarding claims 13-23 recite a system but it appears reasonable to interpret this system by one of ordinary skill in the art as software, per se. The specification provides no explicit and deliberate definition of the component ("circuitry") that makes up the system other than it could be software component, which is directed to functional descriptive material, per se (see paragraph 22 in the specification).
- Regarding claim 13-16, 19, 24-27 and 30 recite the phrase "operable to", which indicates intended use and as such does not carry any patentable weight. The limitations following the phrase "operable to" describe only intended use but not necessarily required functionality of the claim. Limitations following the phrase "operable to" do not carry patentable weight, which cause the claims appear as a series of non-functional descriptive material/data without any functional relation with each other. Claims 14-23 directly or indirectly depend on claim 13, and therefore, suffer the same deficiency. Claims 25-35 directly or indirectly depend on claim 24, and therefore, suffer the same deficiency.
- Regarding claims 24-35 recite an article of manufacture, which is directed to software, per se, lacking storage on a medium, which enables any underlying functionality to occur (see paragraph 21 in the specification). Software per se is non-statutory.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Worrell (United States Patent No.: 5,774,709).

As per claims 1, 13 and 24:

Worrell discloses:

- accessing a program comprising a plurality of instructions including at least one no operation (NOP) instruction (see at least **FIGS 1A-1B**); and
- removing at least one NOP instruction in the program that is not needed to provide a processing delay to ensure data is available to at least one dependent instruction accessing the data (see at least col. 4, line 55-67 “**a NOP instruction in the delay slot for the instruction sequence on the left is replaced by the target instruction itself in the optimized sequence on the right**”).

As per claims 2, 14 and 25:

Worrell discloses:

- deleting one NOP instruction in the program that is not needed to provide the processing delay to ensure the data is available to at least one dependent

instruction without moving a non-NOP instruction (see at least col. 4, line 55-67 and col. 4, line 1-50); and

- replacing one NOP instruction with one determined instruction preceding the NOP instruction in response to determining that one instruction preceding at least one NOP instruction is capable of replacing the NOP instruction in the program (see at least col. 4, line 55-67 **"a NOP instruction in the delay slot for the instruction sequence on the left is replaced by the target instruction itself in the optimized sequence on the right"** – a NOP instruction is replaced by the target instruction XX which is preceding the NOP instruction).

As per claims 3, 15 and 26:

Worrell discloses:

- deleting at least one instruction in the program that is not needed to provide the processing delay to ensure the data is available to at least one dependent instruction (see at least col. 4, line 55-67 **"a NOP instruction in the delay slot for the instruction sequence on the left is replaced by the target instruction itself in the optimized sequence on the right"**); and
- after deleting the at least one instruction, replacing at least one NOP instruction with one determined instruction preceding the at least one NOP instruction in response to determining that one instruction preceding at least one NOP instruction is capable of replacing the NOP instruction in the program (see at least col. 4, line 55-67 **"a NOP instruction in the delay slot for the instruction**

sequence on the left is replaced by the target instruction itself in the optimized sequence on the right” – a NOP instruction is replaced by the target instruction XX which is preceding the NOP instruction).

As per claims 4, 16 and 27:

Worrell discloses:

- performing an additional iteration of deleting at least one instruction and then replacing the at least one NOP instruction in response to replacing at least one NOP instruction (see at least col. 4, line 55-67 and col. 5, line 1-50; also see FIG. 2).

As per claims 5, 17 and 28:

Worrell discloses:

- wherein the instructions in the program comprise assembly language instructions coded by a developer (see at least col. 4, line 43 “**programming for MIPS microprocessor**” – **MIPS instruction is machine instruction**).

As per claims 6, 18 and 29:

Worrell discloses:

- determining whether the accessed NOP instruction is needed to delay processing of one dependent instruction following the accessed NOP instruction to ensure that data is available to the dependent instruction accessing the data

(see at least col. 3, line 20-22 **"this present invention provides for the optimization instruction sequences to avoid NOP instructions in branch delay slot" – Meaning determining if there is a NOP instruction in the branch delay slot, remove it**); and

- deleting the accessed NOP instruction in response to determining that the NOP instruction is not needed to ensure that data is available to the dependent instruction accessing the data (see at least col. 4, line 55-67 **"a NOP instruction in the delay slot for the instruction sequence on the left is replaced by the target instruction itself in the optimized sequence on the right"**).

As per claims 7, 19 and 30:

Worrell discloses:

- identifying instructions preceding the NOP instruction that have a delay in writing the results (**It is inherent – the purpose of having an NOP instruction is to delay for a number of cycles to ensure the data is available before executing the dependent instructions. Therefore instructions preceding the NOP instruction must have a delay in writing the result**); and
- identifying dependent instructions following the NOP instruction that are dependent on an availability of data from the identified instructions having the delay in writing the results (**It is inherent – the purpose of having an NOP instruction is to delay for a number of cycles to ensure the data is available before executing the dependent instructions. Therefore instructions**

following NOP instruction are dependent on the availability of data from the previous instructions).

As per claims 8, 20 and 31:

Worrell discloses:

- replacing the accessed NOP instruction with one previous non-NOP instruction that is capable of being moved forward to replace the accessed NOP instruction without preventing data from being available to one dependent instruction following the NOP instruction (see at least col. 4, line 55-67 and col. 5, line 1-50).

As per claims 9, 21 and 32:

Worrell discloses:

- wherein the one previous instruction comprises a preceding instruction closest to the accessed NOP instruction in the program (see at least col. 4, line 55-67 and col. 5, line 1-50).

As per claims 10, 22 and 33:

Worrell discloses:

- deleting at least one NOP instruction not needed to ensure that data accessed by the dependent instruction is available to the dependent instruction, wherein the operations of replacing accessed NOP instructions with previous non-NOP instructions are performed after deleting NOP instructions not needed to ensure

that data accessed by the dependent instruction is available (see at least col. 4, line 55-67 “**a NOP instruction in the delay slot for the instruction sequence on the left is replaced by the target instruction itself in the optimized sequence on the right**”).

As per claims 11, 23 and 34:

Worrell discloses:

- replacing the accessed NOP instruction with one previous non-NOP instruction that is capable of being moved forward to replace the accessed NOP instruction without preventing data from being available to one dependent instruction following the NOP instruction and that is not a branch target instruction (see at least col. 4, line 55-67 and col. 5, line 1-50).

As per claims 12 and 35:

Worrell discloses:

- wherein the program instructions are for execution by an engine in a multiprocessor engine (see at least col. 4, line 44 “**MIPS microprocessors**” – **more than one microprocessors**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip H. Nguyen whose telephone number is (571)

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270-1070. The examiner can normally be reached on Monday - Thursday 10:00 AM - 3:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Y. Zhen can be reached on (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PN
5/10/2007


WEI ZHEN
SUPERVISORY PATENT EXAMINER